Nikon

SMZ1000/SMZ800

OP

MP-107982

MP MASTER

MA32828

EXCEL

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Nikon

Stereoscopic Zoom Microscope

SMZ1000 / SMZ800

Instructions

Thank you for purchasing the Nikon product.
This instruction manual is written for the users of Nikon Stereoscopic Zoom Microscopes.
To ensure correct usage, read this manual carefully before operating the instrument.

- It is prohibited to reproduce or transmit this manual in part or whole without Nikon's expressed permission.
- The contents of this manual are subject to change without notice.
- Although every effort has been made to ensure the accuracy of this manual, if you note any points that are unclear or incorrect, contact your nearest Nikon representative.
- Some of the products described in this manual may not be included in the set you have purchased.

Warning/Caution Symbols Used in This Manual

Though Nikon products are designed to provide you with the utmost safety during use, incorrect usage or disregard of the instructions may cause personal injury or property damage. For your own safety, read the instruction manual carefully and thoroughly before using the product. Do not discard this manual. Always keep it near the product for easy reference.
Inside this instruction manual, safety instructions are indicated with the symbols shown below. Be sure to follow the instructions marked with these symbols for your safety.

Symbol	Meaning
⚠ WARNING	Disregarding instructions marked with this symbol may lead to death or serious injury.
⚠ CAUTION	Disregarding instructions marked with this symbol may lead to injury or property damage.

Be sure to always follow these guidelines.

WARNING

1. **Intended use of this product**
   This product is intended only for microscopy. Do not use it for any other purpose.

2. **Do not disassemble**
   Disassembly may result in damage to the instrument. Never disassemble any part except as described in this operation manual. Contact your Nikon representative if you notice any malfunction of this instrument.

3. **Check the input voltage**
   When using an illuminator, check that the input voltage displayed on the power supply of the illuminator matches the operating voltage. Contact your Nikon representative if the displayed voltage does not match the operating voltage. Use of an improperly matched illuminator may result in damage to equipment.

4. **Power cord**
   Always turn the power switch off and unplug the power cord when replacing the lamp of an illuminator as failure to do so may result in electric shock or equipment damage.

5. **Heat from the light source**
   When using an illuminator, do not place cloth or paper or highly flammable materials, such as gasoline, benzene, thinner or alcohol, near the lamp as there is a danger of fire.
   - Always use lamps that are of the specified rating only. For the lamp rating, please refer to the operation manual.
   - Always turn the power switch off and unplug the power cord when replacing the lamp of a illuminator as failure to do so may result in electric shock or equipment damage.

CAUTION

1. **Caution when replacing lamps**
   The lamp and the surrounding area become very hot during and immediately after using the illuminator. Be careful not to burn yourself. In addition, when replacing a lamp be sure the lamp has cooled sufficiently.

2. **Check the light source**
   Always use lamps that are of the specified rating only. Use of a lamp having a different specification may result in damage to equipment. For the lamp rating, please refer to the operation manual.

1. Installation location

Note the following points when installing the stereoscopic microscope.

- Install the microscope in a location with the temperature between 0° and 40°C, and humidity of less than 80%. If installed in a hot and humid location, mold may form on the lenses or condensation may occur inside, resulting in reduced performance or damage to the microscope.
- Do not install the microscope in a location subject to direct sunlight.
- Install the microscope in a location that is not subject to vibration.
- Install the microscope in a location that is free from dust and dirt.

2. Handle the microscope carefully

The stereoscopic microscope is a precision optical instrument. Handle it carefully and do not subject it to impact. Shock from impact during transportation or operation as well as forcible operations may cause damage to the instrument.

3. Cleaning the lenses

Do not let dust, fingerprints, etc. to get on the lenses. Dirt on the lenses will adversely affect the view of the image. If any lenses become dirty, clean them as described below.

- Use an air blower to blow dust away. If this does not suffice, brush away the dust with a soft brush or gently wipe it away with a piece of gauze.
- Only if the lenses become dirty with fingerprints or grease stains, slightly dampen a piece of soft, clean cotton cloth with absolute alcohol (ethyl alcohol or methyl alcohol) and gently wipe away the dirt. Do not use the same part of the cloth more than once.
- Since absolute alcohol is highly flammable, be careful in handling it so that it does not ignite.
- Observe the manufacturer's handling instructions when handling absolute alcohol.

4. Cleaning painted or plastic parts

Use of silicon cloth is recommended when cleaning painted parts, plastic parts and printed parts. If such a part becomes excessively dirty, wipe it gently with gauze dampened in a mild detergent solution. Do not use organic solvents (such as alcohol, ether, or paint thinner) as this may result in deformation of the part or remove of lettering.

5. Storage

Store the microscope in a location with low humidity where mold is unlikely to form. Do not store the microscope in a location subject to direct sunlight or high temperature and humidity. During storage, place a plastic cover over the equipment to prevent dust accumulation.

6. Regular inspections

Regular inspections are recommended in order to maintain peak performance. Please consult your Nikon representative for details about regular inspections.

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I Nomenclature

The figures on p.8 & 9 show a SMZ1000 zooming body, with P-BT binocular eyepiece tube, C-W 10X eyepieces, Plan Apo 1X objective, C-FMC focusing mount, and C-PS160 plain stand.

Diopter ring

Refer to "Adjust the diopter" on p.16.

Eyepieces

10X, 15X, 20X and 30X eyepieces are available.

Eyepiece tube clamp screw

Zooming body clamp screw

Fixes the zooming body to the focusing mount.

Zooming body

Outside diameter of the part to be mounted the focusing mount: ϕ76

Objective

Plan 1X, Achro 0.5X, Plan 1X ERGO, Plan Apo 0.5X, Plan Apo 1X, ED Plan 1.5X and ED Plan 2X objectives are available. HR Plan Apo series objectives for SMZ1500 can be used also, but the magnification in this case becomes 1.25 times the magnification indicated on the objective itself. Refer to Table 1 on p.36.

Groove for mounting accessories

Holds the Fluorescent ring illuminator, Fiber optic ring illuminator and the like. Outside diameter: ϕ60

Stage plate clamp screw

Fixes the stage plate to the stand base.

Eyepiece sleeve

P-BT Binocular eyepiece tube

P-BTL low eye-level eyepiece tube and P-BERG tilted eyepiece tube are also available.

Zooming knob

Changes the magnification of the sample image. Refer to "Zoom" on p.17.

Coarse focus knob

Refer to "Focusing" on p.16.

Fine focus knob

Refer to "Focusing" on p.16.

Stand

C-PS160 Stand base

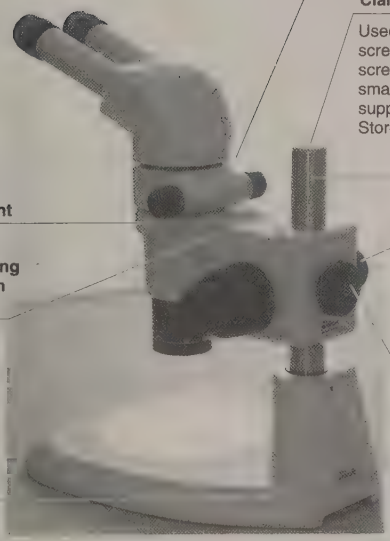
Various stands are available.

Screw for mounting accessories

Holds the 1/4 lambda plate and the like. The screw on the inside diameter: M55 × 0.75

Stage plate

The black or the white side can be chosen according to the sample.



Zooming knob 'clicks ON/OFF screw (inside)

Refer to "ON/OFF of the Zooming Knob Clicks" on p.17.

Clamp tool

Used for the stage plate clamp screw, eyepiece tube clamp screw, etc. Same size as the small hexagonal wrench supplied with the zooming body. Stored in the top of the pillar.

Pillar

C-FMC Focusing mount

Torque adjustment ring (Innermost ring)

Adjusts the torque of the focus knob. (Refer to "Adjust the focus knob torque" on p.15.)

Screw hole for mounting an Epi-arm for halogen illuminator

Located on both sides of the focusing mount. Holds the G-EIA flexible arm or Epi-arm.

Focusing mount clamp screw

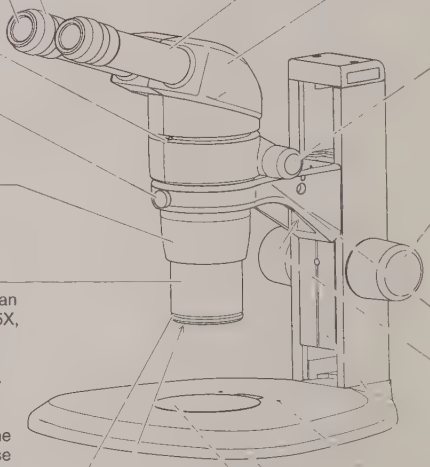
Fixes the focusing mount to the pillar.

Screw hole for mounting accessories

Located on both sides of the stand base. M5

Pillar clamp screw (Inside)

The illustrations on p.10 & 11 show a SMZ800 zooming body, with P-BT binocular eyepiece tube, C-W 10X eyepieces, Plan 1X objective, and C-PS plain focusing stand.



Diopter ring

Refer to "Adjust the diopter" on p.16.

Eyepiece

10X, 15X, 20X and 30X eyepieces are available.

Eyepiece tube clamp screw

Zooming body clamp screw

Fixes the zooming body to the arm.

Zooming body

Outside diameter of the part to be mounted on the arm: ϕ76

Objective

Plan 1X, Achro 0.5X, Plan 1X ERGO, Plan Apo 0.5X, Plan Apo 1X, ED Plan 1.5X and ED Plan 2X objectives are available. HR Plan Apo series objectives for SMZ1500 can be used also, but the magnification in this case becomes 1.25 times the magnification indicated on the objective itself. Refer to Table 1 on p.36.

Groove for mounting accessories

Holds the Fluorescent ring illuminator, Fiber optic ring illuminator and the like.
Outside diameter: ϕ60

Screw for mounting accessories

Holds the 1/4 lambda plate and the like.
The screw on the inside diameter: M55 × 0.75

Eyepiece sleeve

P-BT Binocular eyepiece tube

P-BTL low eye-level eyepiece tube and P-BERG tilted eyepiece tube are also available.

Zooming knob

Changes the magnification of the sample image. Refer to "Zoom" on p.17.

Focus knob

Refer to "Focusing" on p.16.

Arm

Arm fixing screw

Holds the arm. The position of the arm can be chosen from either high or low.

Vertical slider

Hole for clip

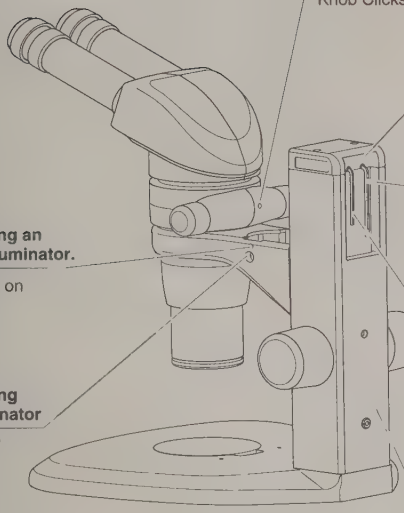
Holds the clip for retaining the sample.

C-PS Focusing stand

Various stands available.

Stage plate

The black or the white side can be chosen according to the sample.



Zooming knob clicks ON/OFF screw (inside)

Refer to "ON/OFF of the Zooming Knob Clicks" on p.17.

Hexagonal wrench hanger

Holds the supplied hexagonal wrenches.

Hexagonal wrench (Large)

Supplied with the focusing stand. Used for changing the height of the arm.

Hexagonal wrench (Small)

Supplied with the zooming body. Used for the eyepiece tube clamp screw and zooming knob clicks ON/OFF screw.

Pillar

Screw hole for mounting an Epi-arm for halogen illuminator.

Screw holes are located on both sides of the arm. Holds the G-EIA flexible arm or Epi-arm.

Screw hole for mounting 6V-10W halogen illuminator

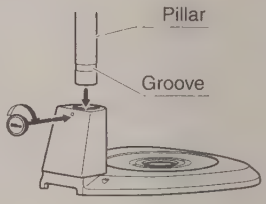
Holds the G-LS 6V-10W halogen illuminator.

II Assembly

☞ • An equipment model name in the bold-faced brackets [ ] indicates that the following description is exclusively for that model.

1 **[C-PS160]**
Attach the pillar to the stand.

Insert the pillar straight into the stand with the groove of the pillar located down as far as the pillar reaches to the bottom. Clamp the pillar using the clamp tool.

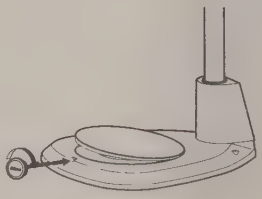


2 **Place the stand on the level surface.**

3 **Mount the stage plate.**

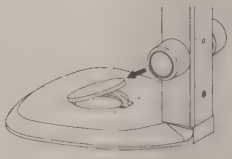
[C-PS160]

Fit the stage plate into the stand base. Tighten the stage plate camp screw using the clamp tool to fix the stage plate.



[C-PS & C-PSC]

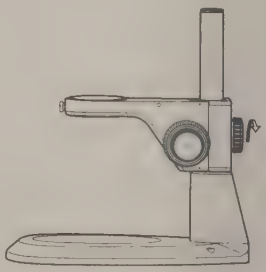
Fit the stage plate into the stand base while pushing it against the rim in the direction shown by the arrow in the illustration.



4 **[C-PS160]**
Fix the C-FMC focusing mount to the pillar.

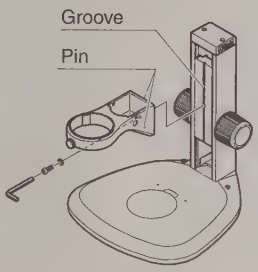
Face the focusing mount to the front and tighten the focusing mount clamp screw.

Note) When fixing the focusing mount to the upper part of the pillar, securely tighten the clamp screw so as not to fall the focusing mount.



5 **[C-PS & C-PSC]**
The stand arm can be lowered. (If you do not need to lower the arm, jump to step 6.)

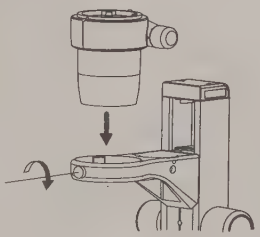
Use the hexagonal wrench (large - supplied with the focusing stand) to loosen the arm fixing screw. Reattach the arm using the screw hole at the lower side of the vertical slider. The arm will become 55 mm lower than its original position. Before tightening the screw, make sure that the two pins on the arm fit in the grooves on the vertical slider.



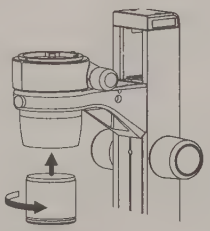
6 **Mount the zooming body.**

Lightly tighten the zooming body clamp screw to hold the zooming body on the focusing mount or arm.

Note) Do not over-tighten the zooming body clamp screw since it may cause damage to the instrument.

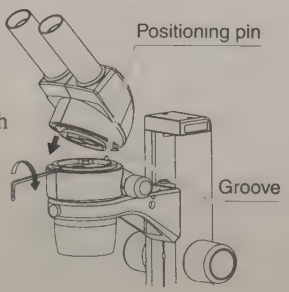


7 **Screw the objective into the bottom of the zooming body.**



8 **Mount the eyepiece tube.**

Align the groove on the eyepiece tube with the positioning pin on the zooming body, push the eyepiece tube toward the back to attach. Tighten it to the zooming body using the supplied hexagonal wrench (small) or the clamp tool supplied with the C-PS160.



9 Insert the eyepieces into the eyepiece sleeves.

Be sure that it is inserted all the way until it touches the end of the sleeve.

Note) When inserting the eyepiece, hold the rubber cover of the eyepiece. Holding the diopter ring causes a failure. Especially, be careful with the 10X eyepieces because their rubber covers obstruct the view of the sleeve end.

10 The hexagonal wrenches and clamp tool can be stored in the pillar of the stand.

Refer to the figures on p.9 and p.11.

1 Preparations For Observation

1 Adjust the torque of the focus knob.

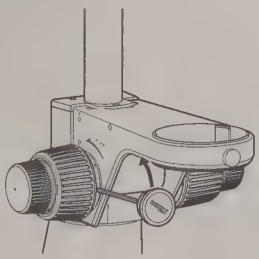
Adjust the torque of the focus knob so as not to fall down the zooming body on its own weight.

[C-FMC]

Turn the torque adjustment ring using the clamp tool. Turning the ring in the direction of the arrow indicated on the side surface of the focusing mount will increase the torque.

Note) • *Do not twist the left and right focus knobs.*
• *Do not turn the knob beyond its turning limit.*
• *Do not turn the fine focus knob while holding the coarse focus knob or vice versa. Otherwise, the damage to the instrument will result.*

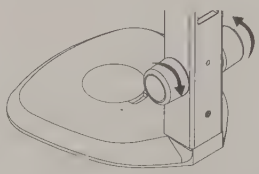
Increasing the torque.



[C-PS and C-PSC]

Rotating the left and right focus knobs in the opposite direction as shown in the illustration will increase the torque.

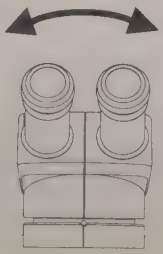
Increasing the torque.



(To reduce the torque, turn the knob in the direction opposite to the arrow.)

2 Adjust the interpupillary distance.

This adjustment should be performed every time the observer is changed since the interpupillary distance differs between individuals. Adjust the interpupillary distance so that the view field for each eye is merged into one. Move while holding each sleeve with both hands.



3 Adjust the diopter.

This adjustment should be performed every time the observer is changed since the eyesight differs between individuals.

1. Turn the diopter rings on both eyepieces to set them at the 0 position (match the 0 line with the index line).
2. Turn the zooming knob to the highest magnification. Focus on the sample using the focus knob. (Refer to "Focusing".)
3. Turn the zooming knob to the lowest magnification. Peering through the left eyepiece with the left eye, focus on the sample using the diopter ring on the left eyepiece. Then, peer through the right eyepiece with your right eye and focus on the sample using the diopter ring on the right eyepiece.
4. Repeat steps **2** and **3** until the image is kept focused even though the zooming magnification is changed. This adjustment ensures sharp image throughout the zooming range.

2 Focusing

1 Check the working distance.

The distance between the focus plane and the bottom of the objective is called the working distance. Focusing is easier if beforehand the distance between the specimen and the bottom of the objective is set to the working distance. The working distance differs depending on the objective being used. Please refer to Table1 on p.36.

2 Focus on the sample.

Turning the focus knob moves the zooming body up and down and brings focus on the sample.

[C-FMC]

Using the fine focus knob will permit the delicate focusing. Especially, it is effective for the high magnification observation.

3 Zoom

1 Change the zooming magnification.

Turning the zooming knobs on the left and right side of the zooming body will change the magnification of the sample image.

■ Total Magnification

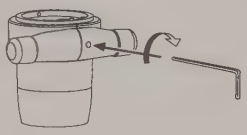
The zooming knob has the indication of the zooming magnification. The total magnification can be found by multiplying the magnification of the objective times that of the eyepieces.

Note) When the HR Plan Apo series objective for the SMZ1500 is used, the total magnification will be obtained by multiplying by 1.25.

■ ON/OFF of the Zooming Knob Clicks

The clicks on the zooming knob can be eliminated.

1. Insert the supplied hexagonal wrench (small) or the clamp tool supplied with the C-PS160 into the screw hole on the rear of the zooming body.
2. Turning the inside screw in the direction opposite to the arrow eliminates the clicks (OFF). Turning the same screw in the direction of the arrow puts on back the clicks (ON).



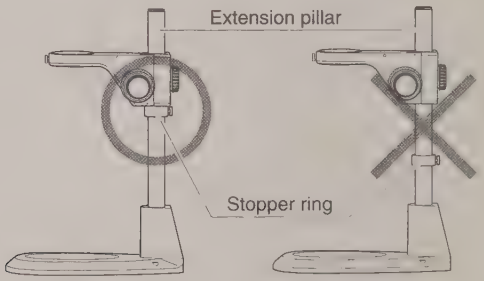
4 If You Cannot Focus On The Sample Though The Zooming Body Is At The Highest Position.

When you use the 0.5X objective or observe a tall sample, you may not be able to focus on the sample though turning the focus knob to raise the zooming body to its highest position.

[C-PS160]

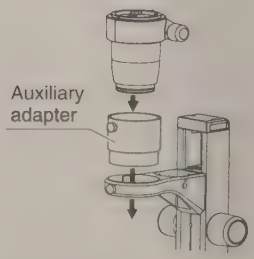
Exchange the pillar for the C-EP extension pillar available on order. Attach the C-EP extension pillar to the stand in the same manner as for the standard pillar. (Hold the side having the groove downward. Refer to item 1. on p.12.) Put the stopper ring on the pillar and then the focusing mount. Tighten the focusing mount clamp screw.

Note) Contact the bottom surface of the focusing mount with the stopper ring and securely tighten each clamp screw.



[C-PS & C-PSC]

Use the C-ER auxiliary adapter available as an option. (This adapter can't be used for the SMZ1000.)

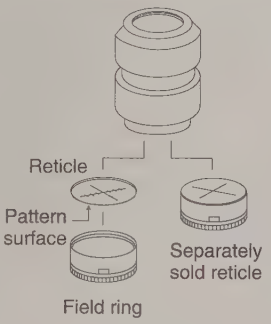


☞ • Refer to the Table 2 on p.38 for the sample heights which may be viewed.

IV Using Accessories

1 Reticles

Your reticles may be attached to the eyepiece. Once remove the field ring (or lens room of the 20X and 30X) from the eyepiece. Attach the reticle with its pattern surface facing down to the eyepiece and reattach the field ring (or lens room).



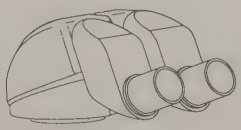
☞ • Refer to the Table 1 on p.36 for the size of the reticle which may be attached.

Note) The 20X and 30X eyepieces adopt the internal focusing system, and the primary image has the magnification. Use the reticle with 1.3X pattern for 20X eyepiece, and with 1.4X pattern for 30X eyepiece.
A reticle with cross hairs, scaled cross hairs, or photographic mask is available on order for 10X eyepiece.

2 Eyepiece Tube

1 P-BTL low eye-level eyepiece tube

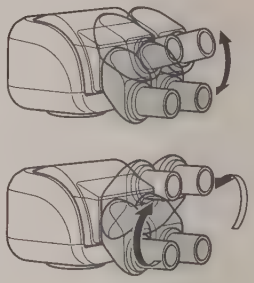
When using a beam splitter or coaxial episcopic illuminator, it is possible to lower the eye level (eye level during observation) by using this eyepiece tube in place of the binocular eyepiece tube.
The installation procedure for this eyepiece tube is the same as for the P-BT binocular eyepiece tube.



P-BTL

2 P-BERG tilted eyepiece tube

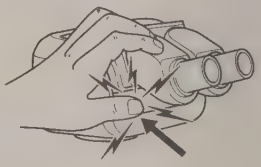
This eyepiece tube allows the angle of the eyepiece sleeve to be continuously adjusted as desired by the observer.
It is also possible to change the eye level by rotating the interpupillary distance adjuster (shown in gray in the illustration) 180°.
The installation procedure for this eyepiece tube is the same as for the P-BT binocular eyepiece tube.



P-BERG

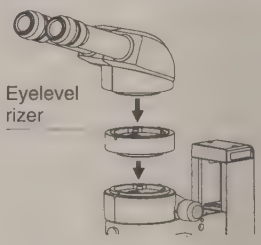
CAUTION

Be careful not to put your fingers between the interpupillary distance adjuster and the lower part of the eyepiece tube when adjusting the angle of the sleeve.



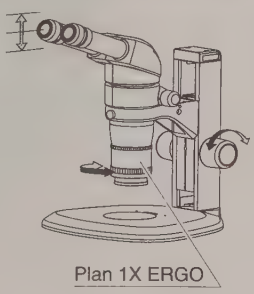
3 P-IER Eyelevel Rizer

When the eye level is too low, it is possible to raise the eye level by 25 mm by attaching a P-IER Eyelevel rizer between the zooming body and the eyepiece tube. It is possible to use up to three Eyelevel rizers at once.
Avoid using the four or more Eyelevel rizers at once or using the other intermediate tube together such as a beam splitter or coaxial episcopic illuminator. It may cause the vignetting around the image periphery.



4 Plan 1X ERGO Objective

Using the Plan 1X ERGO objective allows you to continuously change the eye level through a 40 mm range while maintaining a constant working distance (50 mm).

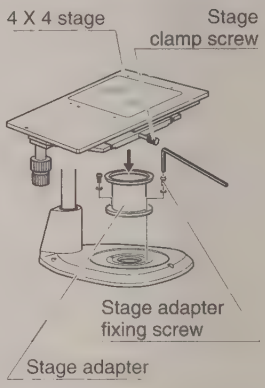


1. Rotate the upper knurled ring on the Plan 1X ERGO objective to attach it to the zooming body.
2. Rotate the focus knobs on the focusing stand to raise or lower the microscope to set to the height best suited for viewing.
3. Rotate the lower knurled ring to focus on the specimen. Use the microscope as usual after setting the eye level.

Note) When attaching to the SMZ1000, vignetting will occur in the lateral direction of the viewfield at the high eye level with 1X or lower zoom magnification.

5 SM-S4L 4 X 4 Stage L

SM-S4L 4 X 4 stage L may be attached by using the C-4SA stage adapter. In this case, use the C-ER auxiliary adapter or C-EP extension pillar because the position of the sample will become higher. (Refer to "4. If you cannot focus on the sample though the zooming body is at the highest position.".)



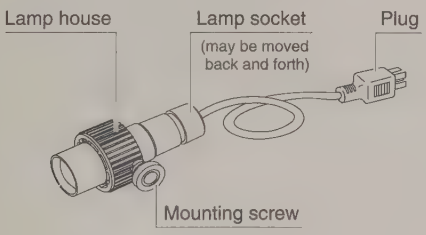
1. Remove the stage plate from the stand base, and attach the C-4SA stage adapter in place using the fixing screws supplied with the adapter.
2. Sufficiently loosen the stage clamp screw of the SM-S4L 4 X 4 stage L. Fit and mount the stage onto the stage adapter with the side equipped with the stage clamp screw facing front. Tighten the stage clamp screw.

1 Halogen Illuminators

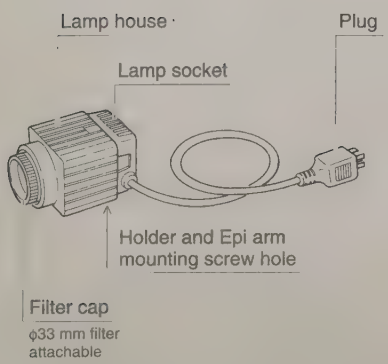
There are two illuminators available: the G-LS of 6V 10W and the C-DSLS of 6V 20W.

Note) These illuminators are not adequate to observe the sample having a high reflective surface. Use the P-ICI2 Coaxial Episcopic Illuminator on p.29 for this purpose.

G-LS
(6V10W)



C-DSLS
(6V20W)

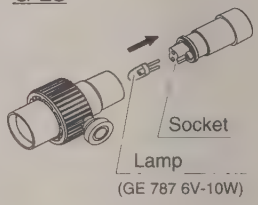


1 Lamp

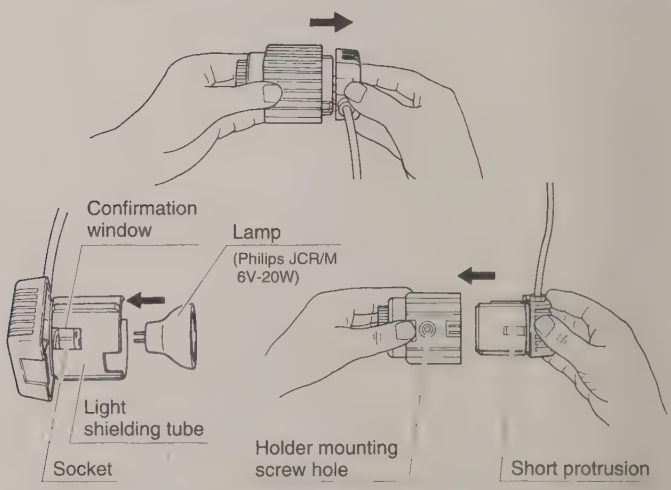
CAUTION The lamp and the surrounding area become very hot during and immediately after using the illuminator. Be careful not to burn yourself. In addition, be sure the lamp has cooled sufficiently before replacing a lamp.

Pull the lamp socket from the lamp house and insert the lamp straight into the socket as far as it will go. Only use halogen lamps of the specified rating.
Next, attach the lamp socket to the lamp house.

G-LS



C-DSLS

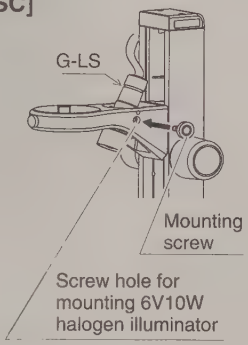


Note) Do not touch the glass part of a lamp with your bare hands as your skin may burn and stick to the lamp, possibly reducing its level of light output or causing damage to the lamp. When replacing a

lamp, handle it through a piece of cloth or through its packaging until replacement is complete. If you get fingerprints on the lamp, wipe gently with a piece of clean cloth dampened with alcohol.

2 Attaching G-LS to the stand [C-PS & C-PSC]

Set so that the protrusion on the lamp house aligns with the inside of the screw hole on the arm of the stand (screw hole for mounting 6V10W halogen illuminator) and secure it in place from the outside of the arm using the mounting screw.

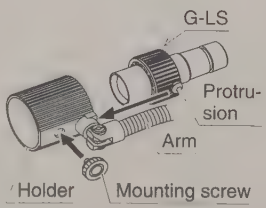


3 Arm for halogen illuminators

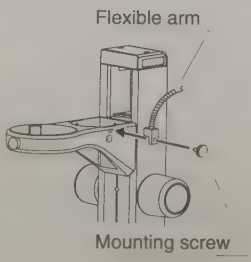
It is possible to freely adjust the direction of illumination by using a special arm.

1 G-EIA flexible arm [G-LS]

Set so that the protrusion on the lamp house aligns with the inside of the hole in the holder of the flexible arm and secure it in place from the outside of the holder using the mounting screw.

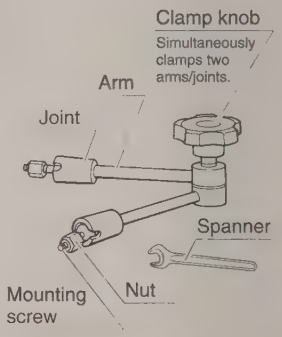


Secure by screwing the mounting screw supplied with the arm into the arm mounting screw hole in the stand (screw hole for mounting an Epi-arm).

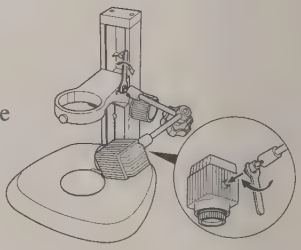


2 Epi arm

Slightly loosen the clamp knob on the arm. Screw in the mounting screw at the end of the Epi arm into the screw hole of the stand (screw hole for mounting an Epi-arm) while turning the joint. Next, securely tighten the nut using the supplied wrench.
Epi arm may be attached also to the screw hole for mounting accessories of C-PS160.

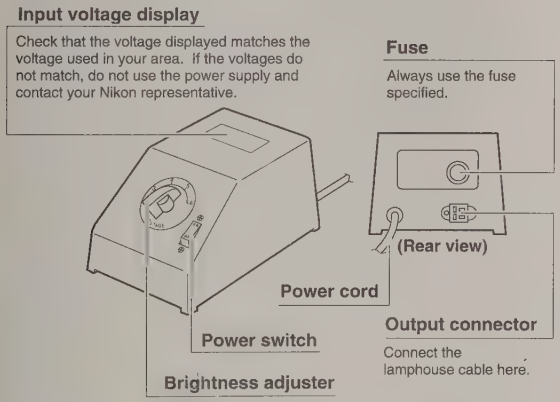


Screw the mounting screw at the other end of the Epi arm into the screw hole on the lamp house in the same manner as described above. Set the lamp house in a position that makes for easy viewing and tighten the clamp knob.

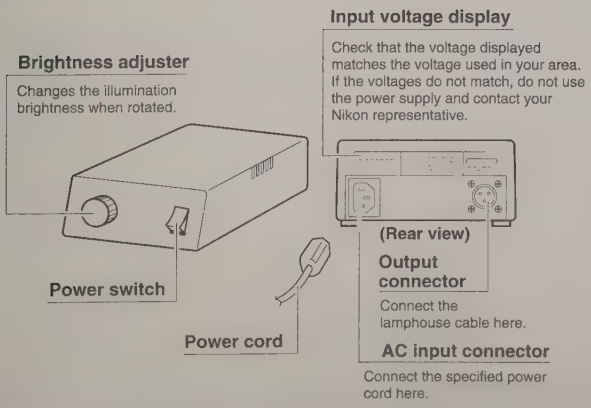


4 Power supplies

Use the Power Supply XN for regions using 100/120 V power, and the Power Supply TN-PSE30 for regions using 230 V power. Insert the plug of the Halogen illuminator into the output connector located on the rear of the power supply.


Input voltage display
Check that the voltage displayed matches the voltage used in your area. If the voltages do not match, do not use the power supply and contact your Nikon representative.
Fuse
Always use the fuse specified.
(Rear view)
Power cord
Output connector
Connect the lamphouse cable here.
Power switch
Brightness adjuster
Changes the illumination brightness when rotated.

Power Supply XN (only for regions with 100/120 V power)


Input voltage display
Check that the voltage displayed matches the voltage used in your area. If the voltages do not match, do not use the power supply and contact your Nikon representative.
Brightness adjuster
Changes the illumination brightness when rotated.
(Rear view)
Output connector
Connect the lamphouse cable here.
Power switch
Power cord
AC input connector
Connect the specified power cord here.

Power Supply TN-PSE30 (only for regions with 230 V power)

Power Supply XN (only for regions with 100/120 V power)

Input rating	Power supply for 100V regions only: 100 V AC, 50/60 Hz, 30 W Power supply for 120V regions only: 120 V AC, 50/60 Hz, 30 W
Output rating	3-6 V AC, 3.3 A
Fuse rating	250 V, 1 A

Power Supply TN-PSE30 (only for regions with 230 V power)

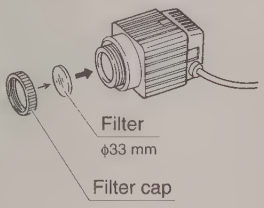
Input rating	230V AC, 50/60Hz, 0.3A
Voltage fluctuation	±10%
Output rating	AC 6V 5A
Internal fuse	Fast acting type, F1A/250V, 5.2 × 20 mm
Operating environment	Altitude: 2000 m max. Temperature: 0° - 40°C (indoor use only) Relative humidity: 85% max. (no condensation) Pollution level: Degree 2 Installation: Category 2
Storage environment	Temperature: -20° - 60°C Relative humidity: 90% max. (no condensation)
Protection class	Class 1
Power cord	Use only the following power supply cord. Using the wrong power cord could result in danger or fire. The protection Class 1 equipment should be connected to PE (protective earth) terminal. • For 220-240V AC area Approved according to EU/EN standards, 3 conductor grounding Type H05VV-F, 3 m long maximum, rated at 250V AC minimum.

5 Lighting area adjustment [G-LS]

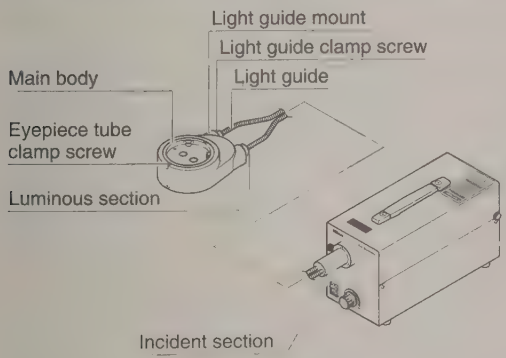
It is possible to adjust the lighting area by moving the lamp socket back and forth. Adjust the lighting area to allow easy viewing.

6 Attaching filters [C-DSLS]

Rotate and remove the filter cap at the end of the lamp house and insert a filter. Use filters that have a diameter of 33 mm and a width of 1.5 ~ 2 mm.



2 P-ICI2 Coaxial Episcopic Illuminator



Fiber illuminator

Fiber illuminator (C-FI115 for 100/120V region and C-FI230 for 230V region) available on order is necessary for the light source.
Read also the Instruction Manual of the Fiber Illuminator C-FI115/C-FI230.

Magnification of the P-ICI2 Coaxial Episcopic Illuminator is 1.5X. Total magnification is obtained by multiplying 1.5 by the total magnification of the basic set of the microscope.

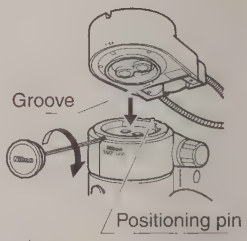
Note) Usable magnification for the P-ICI2 Coaxial Episcopic Illuminator is restricted. Use the magnification within the range shown in the right

Objective	Zooming magnification
Acro 0.5X	3X or higher
Plan 1X	1.5X or higher
Plan 1X ERGO	1.5X or higher
Plan Apo 0.5X	4X or higher
Plan Apo 1X	2X or higher
ED Plan 1.5X	2X or higher
ED Plan 2X	Not usable
HR Plan Apo 0.5X	2.5X or higher
HR Plan Apo 1X	2.5X or higher
HR Plan Apo 1.6X	Not usable

table. If the magnification out of the specified range is used, uneven illumination will occur or the seeing of the sample image will be degraded.

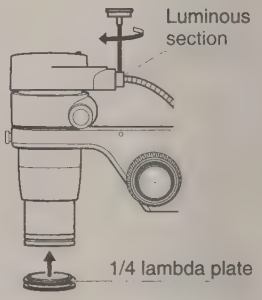
1 Mount the P-ICI2 onto the zooming body aligning the groove on the bottom of the P-ICI2 main body with the positioning pin on the zooming body while tilting the P-ICI2 toward the rear. Tighten the eyepiece tube clamp screw.

Note) When the other intermediate tube such as a beam splitter is used together, attach it on the P-ICI2.

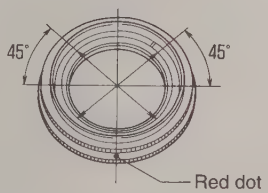


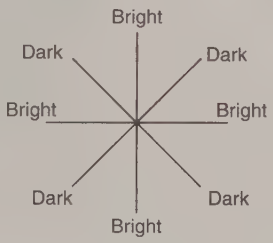
2 Screw in the 1/4 lambda plate to the end of the objective. When the C-FIR ring fiber light guide is used together, use the other 1/4 lambda plate separately available for ring fiber illuminator.

3 Insert the incident section of the light guide into the light guide mount of the fiber illuminator and tighten the clamp screw. Insert the luminous section of the light guide into the light guide mount of the P-ICI2 and tighten the clamp screw.



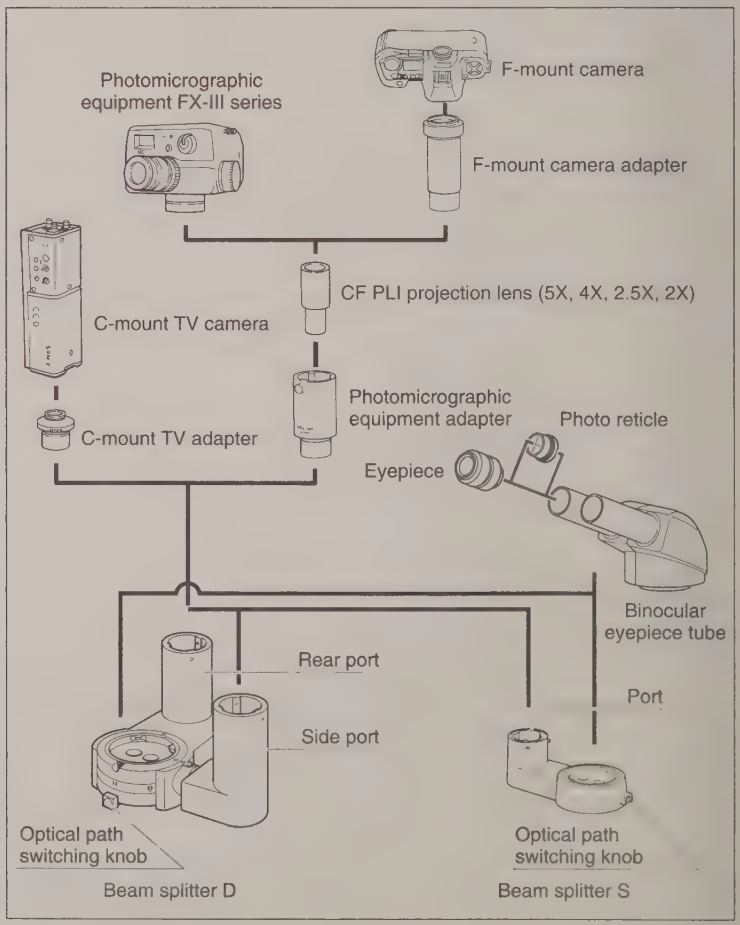
4 The optical axis of the 1/4 lambda plate is at the 45° position from the red dot. Brightness is the maximum when the red dot is positioned at the front and switches from bright to dark by each 45° position. Adjust the plate to the position where the brightness and contrast are best suited for the observation.





5 Insert the filter P-ICI33 NCB14 into the fiber illuminator to improve the color reproducibility when taking a photomicrogaph. Refer to the instruction manual of Fiber Illuminator.

It is possible to photograph images or display them on a TV monitor by attaching a beam splitter between the zooming body and the eyepiece tube.
There are two beam splitters available: the S P-IBSS with one port and the D P-IBSD with two ports.
Read also the instruction manual of the instrument such as a photomicrographic equipment or TV camera to be used.



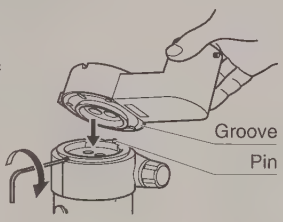
1 Photomicrographic magnification

Photomicrographic magnification = (PLI projection lens magnification) × (Zoom magnification) × (Objective magnification)

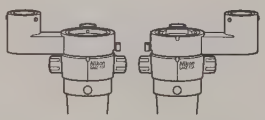
- When the P-ICI2 Coaxial Episcopic Illuminator is used:
  Photomicrographic magnification = (PLI projection lens magnification) × (Zoom magnification) × (Objective magnification) × 1.5
- When the HR Plan Apo series objective is used:
  Photomicrographic magnification = (PLI projection lens magnification) × (Zoom magnification) × (Objective magnification) × 1.25

2 Attaching the beam splitter

Mount the beam splitter onto the zooming body aligning the groove on the bottom of the beam splitter with the positioning pin on the zooming body while tilting the beam splitter toward the rear. Tighten the eyepiece tube clamp screw.



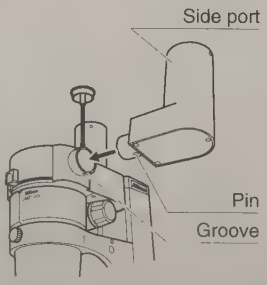
[P-IBSS] Mount it so as to position the port at either the left or right.



P-IBSS Port location

[P-IBSD]

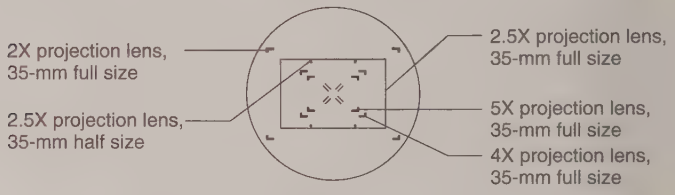
1) Mount it so as to position the rear port at the rear.
2) Attach the side port to the beam splitter main body with the positioning pin on the side port fitted into the groove on the beam splitter main body. Tighten the side port clamp screw.



P-IBSD Attaching side port

3 Photo reticles

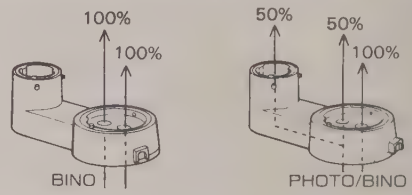
Attaching the C-FP photo reticle to the C-W10X eyepiece permits you to make focusing for phtotomicrography through the eyepiece. Select the correct frame indicating the area being photographed according to the magnification of the PLI projection lens. For more accurate focusing and photographing area, use the finder of the photomicrographic equipment.



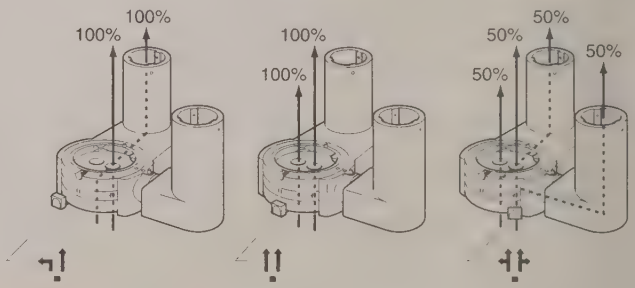
4 Photomicrography procedure

1 Switching the optical path

[P-IBSS] Set the optical path switching knob to PHOTO/BINO.



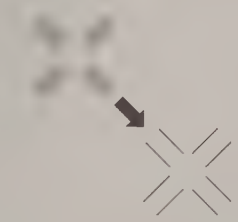
[P-IBSD] Set the optical path switching knob to the left or right. Setting it to the left allows you to use only the rear port and setting it to the right, both the rear and side ports.



2 Focusing

The following is the focusing procedure using the photo reticle. For the focusing procedure using the finder of the photomicrographic equipment, refer to the instruction manual of the phtotomicrographic equipment.

1 Once remove the field ring of the eyepiece and attach the photo mask reticle. (Refer to p.19 "1. Reticles".)
2 Turn the diopter ring to focus on the reticle.
3 Turn the focus knob to focus on both the reticle and the image.



Adjust so that the double crosshairs is clearly divided in two

Note) [P-IBSD]
You can not observe the image through the left eyepiece if the optical path switching knob is set to the left. In this case, use the finder of the photomicrographic equipment for focusing. Focusing with the right eyepiece or focusing with the optical path switching knob set to the position other than left may result in defocusing.

3 Adjusting the frame position

Turn the eyepiece to align each frame of the photo mask and the photomicrographic equipment finder. Note that the image seen through the finder is reversed from that seen through the eyepiece.

Finder and eyepiece images

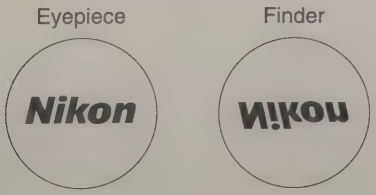


Table 1: Total Magnification and Real Field

SMZ1000

Objectives	Working distance [mm]	Eyepieces							
		10 X Field number 22 Reticle diameter ϕ25		15 X Field number 16 Reticle diameter ϕ19		20 X Field number 12.5 Reticle diameter ϕ19 Magnification 1.3X		30 X Field number 7 Reticle diameter ϕ12 Magnification 1.4X	
		Total magnification	Real field [mm]	Total magnification	Real field [mm]	Total magnification	Real field [mm]	Total magnification	Real field [mm]
Acro 0.5 X	189	4 ~ 40 X	55.0 ~ 5.5	6 ~ 60 X	40.0 ~ 4.0	8 ~ 80 X	31.3 ~ 3.1	12 ~ 120 X	17.5 ~ 1.8
Plan 1 X	78	8 ~ 80 X	27.5 ~ 2.8	12 ~ 120 X	20.0 ~ 2.0	16 ~ 160 X	15.6 ~ 1.6	24 ~ 240 X	8.8 ~ 0.9
Plan 1 X ERGO	50	8 ~ 80 X	27.5 ~ 2.8	12 ~ 120 X	20.0 ~ 2.0	16 ~ 160 X	15.6 ~ 1.6	24 ~ 240 X	8.8 ~ 0.9
Plan Apo 0.5 X	123	4 ~ 40 X	55.0 ~ 5.5	6 ~ 60 X	40.0 ~ 4.0	8 ~ 80 X	31.3 ~ 3.1	12 ~ 120 X	17.5 ~ 1.8
Plan Apo 1 X	70	8 ~ 80 X	27.5 ~ 2.8	12 ~ 120 X	20.0 ~ 2.0	16 ~ 160 X	15.6 ~ 1.6	24 ~ 240 X	8.8 ~ 0.9
ED Plan 1.5 X	44.5	12 ~ 120 X	18.3 ~ 1.8	18 ~ 180 X	13.3 ~ 1.3	24 ~ 240 X	10.4 ~ 1.0	36 ~ 360 X	5.8 ~ 0.6
ED Plan 2 X	32.5	16 ~ 160 X	13.8 ~ 1.4	24 ~ 240 X	10.0 ~ 1.0	32 ~ 320 X	7.8 ~ 0.8	48 ~ 480 X	4.4 ~ 0.4
HR Plan Apo 0.5 X	136	5 ~ 50 X	44.0 ~ 4.4	7.5 ~ 75 X	32.0 ~ 3.2	10 ~ 100 X	25 ~ 2.5	15 ~ 150 X	14 ~ 1.4
HR Plan Apo 1 X	54	10 ~ 100 X	22.0 ~ 2.2	15 ~ 150 X	16.0 ~ 1.6	20 ~ 200 X	12.5 ~ 1.3	30 ~ 300 X	7 ~ 0.7
HR Plan Apo 1.6 X	24	16 ~ 160 X	13.8 ~ 1.4	24 ~ 240 X	10.0 ~ 1.0	32 ~ 320 X	7.8 ~ 0.8	48 ~ 480 X	4.4 ~ 0.4

SMZ800

Objectives	Working distance [mm]	Eyepieces							
		10 X Field number 22 Reticle diameter ϕ25		15 X Field number 16 Reticle diameter ϕ19		20 X Field number 12.5 Reticle diameter ϕ19 Magnification 1.3X		30 X Field number 7 Reticle diameter ϕ12 Magnification 1.4X	
		Total magnification	Real field [mm]	Total magnification	Real field [mm]	Total magnification	Real field [mm]	Total magnification	Real field [mm]
Acro 0.5 X	189	5.0 ~ 31.5 X	44.0 ~ 7.0	7.5 ~ 47.3 X	32.0 ~ 5.1	10.0 ~ 63.0 X	25.0 ~ 4.0	15.0 ~ 94.5 X	14.0 ~ 2.2
Plan 1 X	78	10.0 ~ 63.0 X	22.0 ~ 3.5	15.0 ~ 94.5 X	16.0 ~ 2.5	20.0 ~ 126.0 X	12.5 ~ 2.0	30.0 ~ 189.0 X	7.0 ~ 1.1
Plan 1 X ERGO	50	10.0 ~ 63.0 X	22.0 ~ 3.5	15.0 ~ 94.5 X	16.0 ~ 2.5	20.0 ~ 126.0 X	12.5 ~ 2.0	30.0 ~ 189.0 X	7.0 ~ 1.1
Plan Apo 0.5 X	123	5.0 ~ 31.5 X	44.0 ~ 7.0	7.5 ~ 47.3 X	32.0 ~ 5.1	10.0 ~ 63.0 X	25.0 ~ 4.0	15.0 ~ 94.5 X	14.0 ~ 2.2
Plan Apo 1 X	70	10.0 ~ 63.0 X	22.0 ~ 3.5	15.0 ~ 94.5 X	16.0 ~ 2.5	20.0 ~ 126.0 X	12.5 ~ 2.0	30.0 ~ 189.0 X	7.0 ~ 1.1
ED Plan 1.5 X	44.5	15.0 ~ 94.5 X	14.7 ~ 2.3	22.5 ~ 141.8 X	10.7 ~ 1.7	30.0 ~ 189.0 X	8.3 ~ 1.3	45.0 ~ 283.5 X	4.7 ~ 0.7
ED Plan 2 X	32.5	20.0 ~ 126.0 X	11.0 ~ 1.7	30.0 ~ 189.0 X	8.0 ~ 1.3	40.0 ~ 252.0 X	6.3 ~ 1.0	60.0 ~ 378.0 X	3.5 ~ 0.6
HR Plan Apo 0.5 X	136	6.3 ~ 39.4 X	35.2 ~ 5.6	9.4 ~ 59.1 X	25.6 ~ 4.1	12.5 ~ 78.8 X	20.0 ~ 3.2	18.8 ~ 118.1 X	11.2 ~ 1.8
HR Plan Apo 1 X	54	12.5 ~ 78.8 X	17.6 ~ 2.8	18.8 ~ 118.1 X	12.8 ~ 2.0	25.0 ~ 157.5 X	10.0 ~ 1.6	37.5 ~ 236.3 X	5.6 ~ 0.9
HR Plan Apo 1.6 X	24	20.0 ~ 126.0 X	11.0 ~ 1.7	30.0 ~ 189.0 X	8.0 ~ 1.3	40.0 ~ 252.0 X	6.3 ~ 1.0	60.0 ~ 378.0 X	3.5 ~ 0.6

Table 2: Observable Sample Heights [mm]

SMZ1000 + C-PS160 + C-FMC

Objectives	Mount normal position	Mount up side down position	When using C-EP extension pillar	When using SM-S4L and C-EP extension pillar
Acro 0.5X	0 ~ 24	—	0 ~ 124	0 ~ 13
Plan 1X	0 ~ 97	0 ~ 42	0 ~ 197	0 ~ 86
Plan 1X ERGO	0 ~ 114	0 ~ 59	0 ~ 214	0 ~ 103
Plan Apo 0.5X	0 ~ 25	—	0 ~ 125	0 ~ 14
Plan Apo 1X	0 ~ 102	0 ~ 47	0 ~ 202	0 ~ 91
ED Plan 1.5X	0 ~ 111	0 ~ 56	0 ~ 211	0 ~ 100
ED Plan 2X	0 ~ 108	0 ~ 53	0 ~ 208	0 ~ 97
HR Plan Apo 0.5X	0 ~ 33	—	0 ~ 133	0 ~ 22
HR Plan Apo 1X	0 ~ 103	0 ~ 48	0 ~ 203	0 ~ 92
HR Plan Apo 1.6X	0 ~ 112	0 ~ 57	0 ~ 212	0 ~ 101

SMZ800 + C-PS

Objectives	Arm normal position	Arm lower position	When using auxiliary adapter	When using SM-S4L and auxiliary adapter
Acro 0.5X	0 ~ 2	—	0 ~ 58	—
Plan 1X	0 ~ 75	0 ~ 20	26 ~ 131	0 ~ 20
Plan 1X ERGO	0 ~ 92	0 ~ 37	3 ~ 148	0 ~ 37
Plan Apo 0.5X	0 ~ 3	—	0 ~ 59	—
Plan Apo 1X	0 ~ 81	0 ~ 26	32 ~ 137	0 ~ 25
ED Plan 1.5X	0 ~ 89	0 ~ 34	40 ~ 145	0 ~ 34
ED Plan 2X	0 ~ 87	0 ~ 32	38 ~ 143	0 ~ 31
HR Plan Apo 0.5X	0 ~ 11	—	0 ~ 67	—
HR Plan Apo 1X	0 ~ 82	0 ~ 27	33 ~ 138	0 ~ 27
HR Plan Apo 1.6X	0 ~ 90	0 ~ 35	41 ~ 146	0 ~ 35

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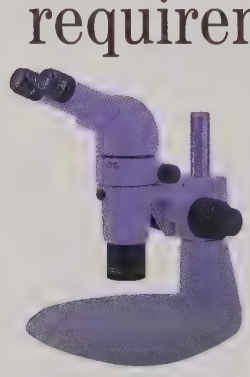
Stereoscopic Zoom Microscopes

SMZ1000
SMZ800

SMZ1000

Unrivaled optical performance, ergonomic d requirements make the SMZ1000 and



At Nikon, a world leader in optical instruments, we are proud of our tireless commitment to providing the very best in optical performance.

At the same time, we realize that this philosophy means nothing if we fail to create products designed with you, the end-user, in mind. No matter how superior the technology used in a given product may be, that product has no real value unless it serves your needs. That's why we design our products only after comprehensive market research and use the most up-to-date technologies to create microscopes that are unrivaled in the field.

Nikon's goal in designing the SMZ1000 and 800 was to create a class of stereoscopic microscopes that would fulfill all the expectations of 21st century users. Nikon took a close look at all aspects of the design and operation of these microscopes, then refined them,

SMZ800

gn, and a variety of accessories to meet your
the instruments of the 21st century.

boosting performance to the pinnacle in their class.
In flexible configurations that allow easy upgrades through the addition of various accessories, the SMZ1000 and 800 feature superlative optical performance that simply out-distances the competition. What's more, they are ergonomically designed to provide comfortable operation and minimize fatigue during long hours of observation.
These are the some of reasons why the SMZ1000 and 800 are the instruments for the 21st century. The SMZ1000 is excellent in both optical performance and cost-to-performance ratio, while the SMZ800 was designed to be extremely cost effective.
Why not experience them first-hand at your local Nikon dealer?

Superior optics coupled with simple ope

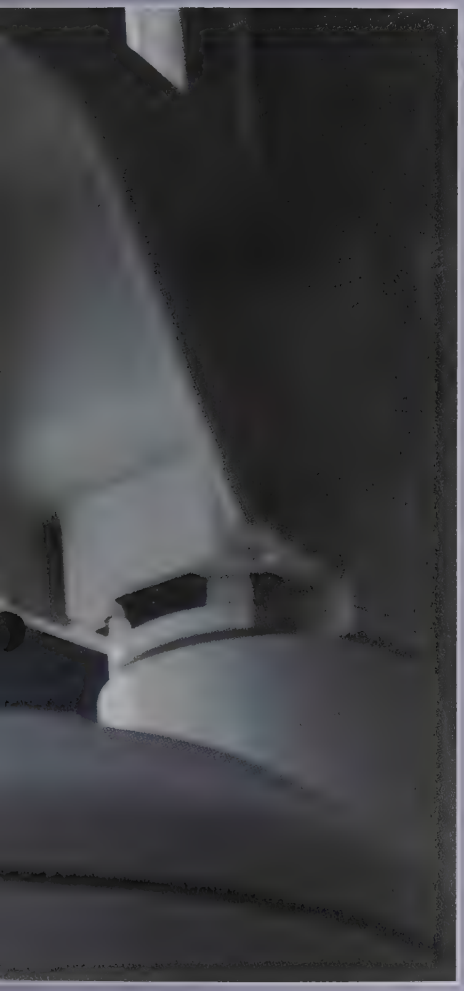
High magnification and large zoom ratio (SMZ1000)
For use at high magnifications, the SMZ1000 features a large 10X zoom ratio, extending from 0.8X to 8X. This gives you a total magnification from 4X to 480X, depending on the combination of eyepiece and objective used. The zooming knob features click-stops, eliminating the need to remove your eyes from the eyepiece while changing magnification.

Comparison of view fields by zoom ratio and magnification

Zooming knob features convenient click-stops.

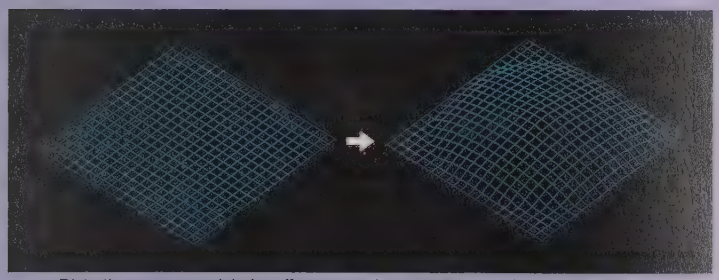
Easy-to-use 6.3X zoom ratio (SMZ800)
With the SMZ800, the zoom ratio is 6.3X extending from 1X to 6.3X, allowing you to obtain just the right magnification for the sample quickly and easily. The zooming knob also features click-stops.

tion bring you unsurpassed performance.



New objectives feature high N.A.'s and high resolving power
In pursuit of sharper and brighter images, Nikon has developed a new series of objectives featuring high N.A.'s and high resolving power. For example, when used with the SMZ1000, the Plan Apo 1X objective boasts an N.A. of 0.1 and a resolving power of 300 lines/mm to produce images that are tack-sharp and display optimum contrast with a minimum of flare, right out to the periphery.

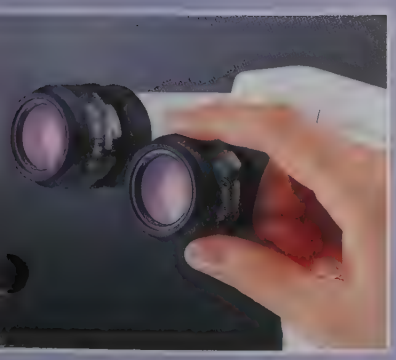
Images appear undistorted and natural-looking
Producing images that cause less strain on your eyes was one goal of Nikon's ergonomic design. We tackled the problems usually associated with stereoscopic microscopes, namely chromatic aberration and distortion in the lens that cause surface irregularities in the image, and solved both to a high degree. Now you can view stereoscopic images that appear undistorted in all their brilliant, true-to-life colors.



Distortion causes a globular effect even when you actually observe a flat object.

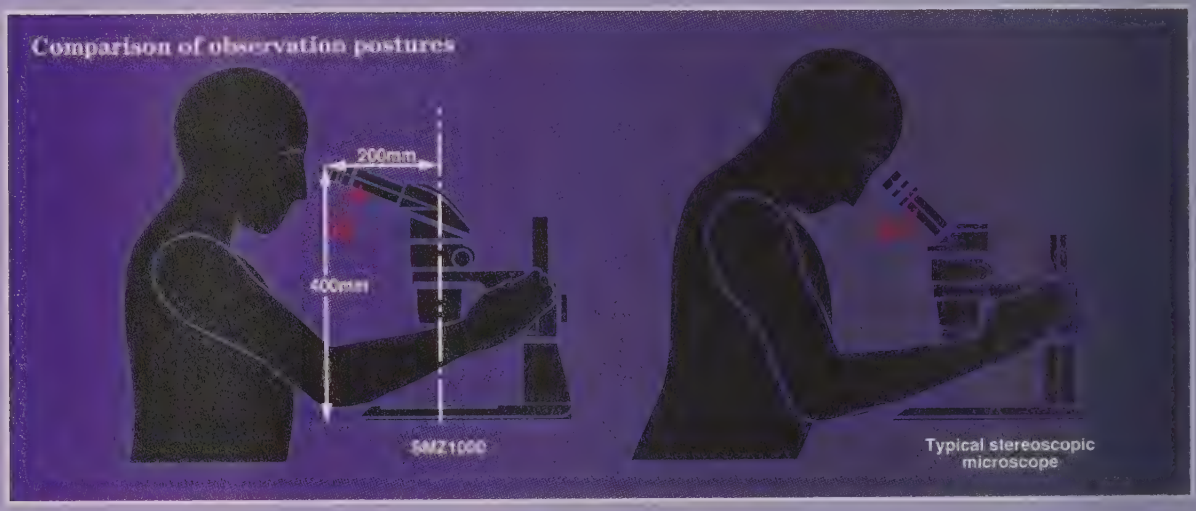
SMZ1000 Conventional model

Comparison of resolving power and chromatic aberration factors



High-eyepoint eyepieces with built-in diopter adjustment
All eyepieces are the high eyepoint-type and have a wide field of view; for example, the standard C-W10X eyepiece has a field of view (F.O.V.) of ϕ 22 mm. In addition, these eyepieces have built-in diopter adjustment, so the image and the reticle are brought into focus at the same time, making viewing easy, while reducing eyestrain.

Ergonomic design ensures comfortable a



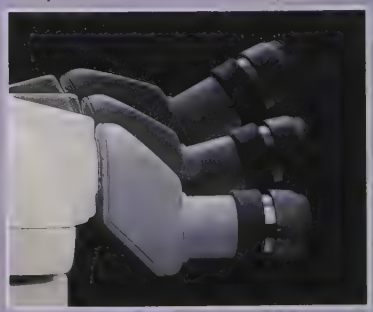
Eyepiece tube inclination of 20°
The standard binocular eyepiece tube is inclined 20°, allowing you to observe samples without having to lean forward. This reduces fatigue during long hours of operation by reducing strain on your neck, shoulders, and back.

Observation at the optimum eyepoint
In addition to the standard type, you have the option of using a low eye-level or tilting binocular eyepiece tube. The low eye-level binocular eyepiece tube enables comfortable observation even when using a diascopic stand or when an intermediate tube is inserted. The tilting binocular eyepiece tube allows adjustment of the eyepiece inclination between 0° and 30° and the eye level can be adjusted 157mm (6.2") by swinging the eyepieces up 180° as well as tilting them. You can even add eye-level risers to customize your microscope to your height—up to three risers for a total of 75mm.

①Standard binocular eyepiece tube, ②Low eye-level eyepiece tube, ③Tilting eyepiece tube, ④Eye-level riser

When two eye-level risers are installed. A maximum of three risers can be used at a time.

With the tilting eyepiece tube, the eye level can be adjusted a maximum of 157mm (6.2").

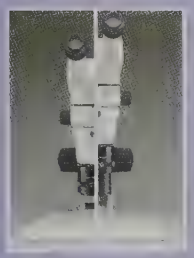


accurate operation in a natural posture.

Ergonomic objective*
When using the ergonomic objective (Plan 1X ERGO), the instrument's eye level is adjusted to match your eyepoint precisely without changing the magnification or working distance.

Note: The ergonomic objective can be used with the SMZ1000 at zoom magnifications larger than 1X.

*Patent pending in Japan



Ergonomic objective can be extended or retracted to adjust the eye level within a maximum range of 40mm (1.6").

Low-position focus knob for quick, effortless focusing
The focus knob of the C-DS Diascopic Stand S is located at a low position and is within easy reach, for comfortable operation while resting your arms on the base.

Coaxial coarse/fine focusing
The C-FMC Focusing Mount C comes with a coaxial coarse/fine focusing unit that travels smoothly along the optical axis. Its new anti-backlash mechanism* makes fine adjustment of focus easier and more accurate.

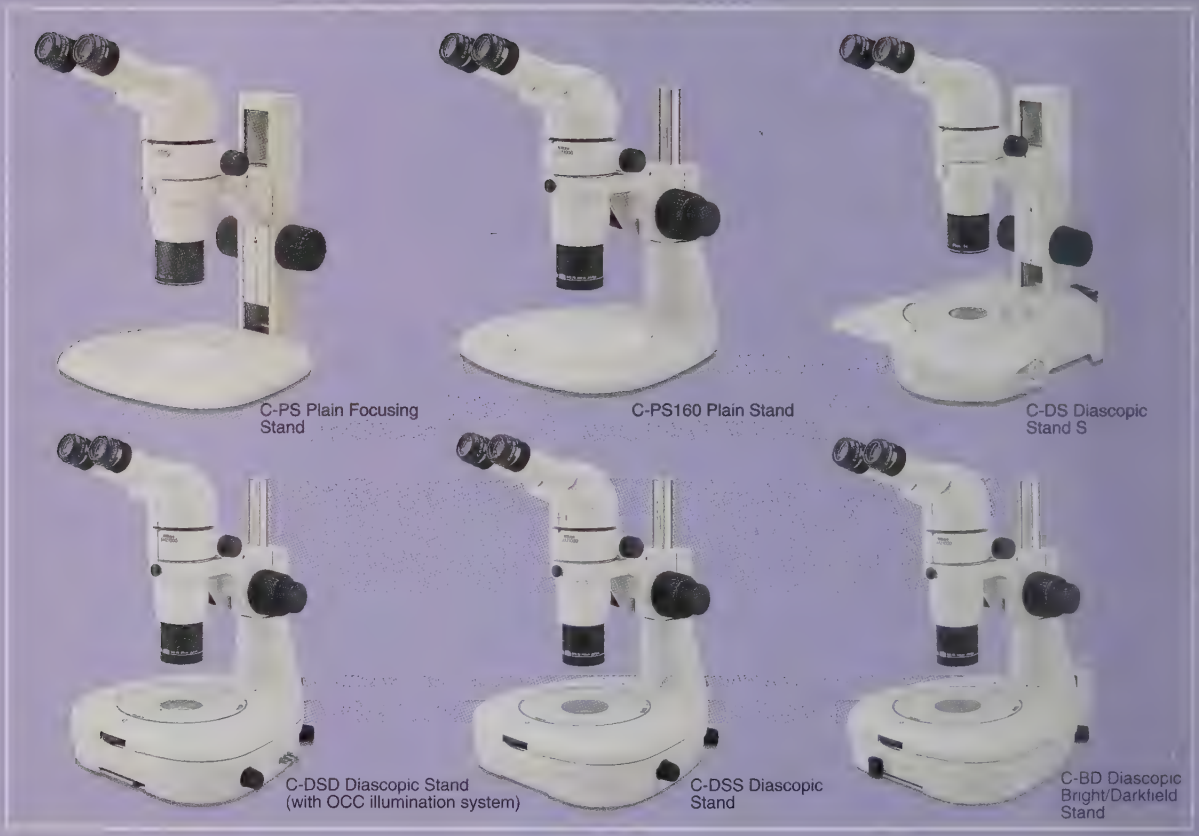
* Patent pending in Japan

Diascopic stands are easier to use
The new Diascopic Stands, models C-DSD, C-DSS, and C-BD, each have a built-in power supply in a space-saving design. These stands also feature their own fine focus knob* at the front of the streamlined base—in addition to the one at the focusing mount—to make critical adjustment of focus much easier, especially during micromanipulations. Furthermore, their stage glass diameter is a generous 180mm (7.1"), making it possible to view samples in large Petri dishes all the way out to the periphery.

* Patent pending in Japan

Large, streamlined base ensures easy operation
The C-PS Plain Focusing Stand features a low profile for easy handling of samples. Moreover, the base has a wide front and smooth curves, allowing you to rest your arms while working.

Expanded accessory lineup for gre


C-PS Plain Focusing Stand
C-PS160 Plain Stand
C-DS Diascopic Stand S
C-DSD Diascopic Stand (with OCC illumination system)
C-DSS Diascopic Stand
C-BD Diascopic Bright/Darkfield Stand

Three new diascopic stands

These new diascopic stands, models C-DSD, C-DSS, and C-BD, each have a 6V-30W halogen lamp with its own built-in power supply. Although their power supplies are built in, they are designed to keep the surface temperature at a low level, creating an environment ideal for living specimens that are sensitive to rises in temperature. An adapter* for the 12V-100W fiber-optics light source is also available.

* Under development

The C-DSD Diascopic Stand features condenser lenses that can be switched between low and high magnifications and allow high N.A. objectives to take advantage of the full potential of their superior resolving power. Furthermore, to answer user requests for high contrast illumination, Nikon developed the Oblique Coherent Contrast (OCC) Illumination system,* allowing colorless and transparent samples to be observed in high relief.

* Patent pending in Japan

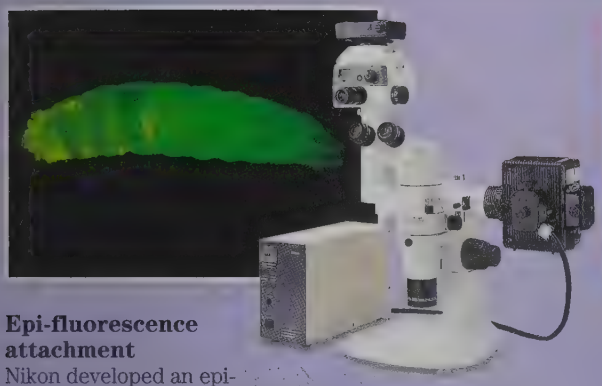
Application example of the OCC illuminator

The C-BD Diascopic Bright/Darkfield Stand uses a seven-sided toroidal mirror* to reduce stray light** substantially.
This stray light would ordinarily cause a decrease in contrast when using short-working distance objectives under darkfield diascopic illumination. But with the C-BD stand, the resulting images have a sufficiently high S/B (signal to background) ratio.

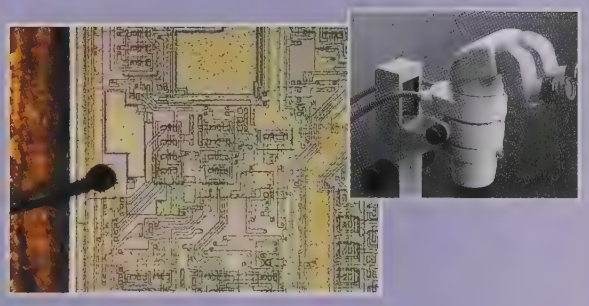
* Patent pending in Japan

** Up to 1/5 that of conventional equipment

r flexibility in various applications



Epi-fluorescence attachment
Nikon developed an epi-fluorescence attachment, model P-FLA, for stereoscopic microscopes that allows easy observation of living cells under the fluorescence method such as GFP. Switching between the fluorescence method and brightfield method is quick and easy. Four filter blocks can be switched using a slide lever. If you add an optional photo port to this attachment, you can mount a photomicrographic system or a CCTV camera without using a beam splitter. Because 100% of the light is delivered to the photo port, bright images are ensured.



Coaxial episcopic illuminator
This illuminator uses a 12V-100W fiber-optics light source—the same light source used in fiber illuminators—to deliver bright illumination over the entire sample surface. The thickness of the 1/4 λ plate has been reduced, minimizing spherical aberrations in high N.A. objectives.

Various illuminators
Various kinds of illuminators can be used to meet individual applications.

Photomicrography or monitoring
By using a beam splitter and adapter, an FX-III Series photomicrographic system, a CCTV camera, or a digital still camera can be attached. The P-IBSD Beam Splitter D has two ports allowing one photomicrographic system and one CCTV camera to be mounted at the same time. The light to the rear port can be switched between 0%, 50%, or 100%, and the light to the side port is switchable between 0% or 50%. With the P-IBSS Beam Splitter S, the light to the side port is switchable between 0% or 50%.

Beam-split ratios

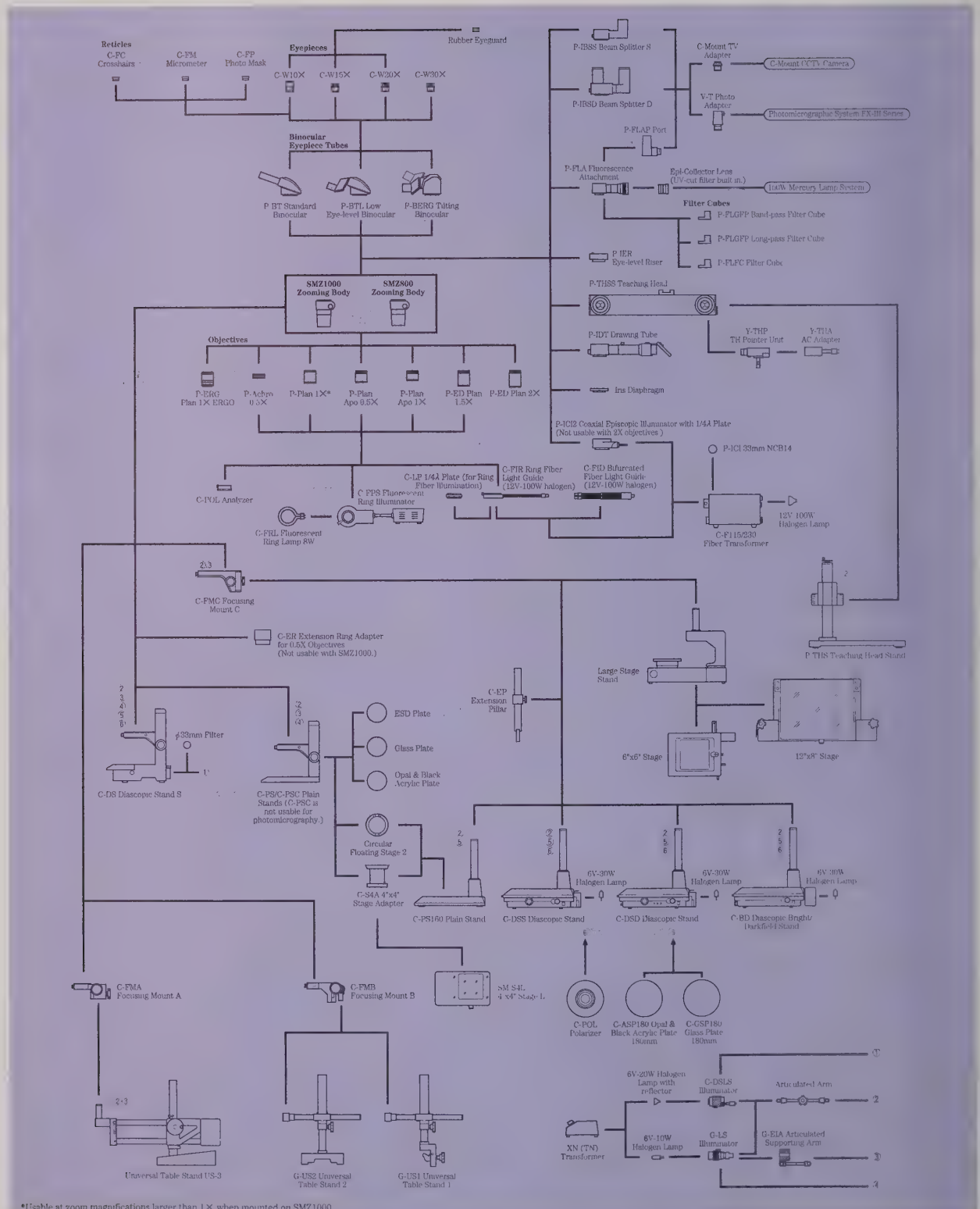
Beam splitter	Observation		Photomicrography	
	Left	Right	Rear port	Side port
P-IBSD	100%	100%	0%	0%
	0%	100%	100%	0%
	50%	50%	50%	50%
P-IBSS	100%	100%		0%
	100%	50%	—	50%

P-IBSS Beam Splitter installed in SMZ1000

P-IBSD Beam Splitter installed in SMZ1000

4"x4" stage
Used in combination with an optional extension pillar, the 4"x4" stage allows precise movement in the XY direction, making fine alignment easy during high magnification observations.

System Diagram



*Usable at zoom magnifications larger than 1× when mounted on SMZ1000

Magnification, Actual Field of View, Working Distance—SMZ1000

Objectives	N.A.	Working distance (mm)	Eyepieces							
			10X eyepiece C-W10X (F.N. 22), Reticle (dia. ø25mm)		15X eyepiece C-W15X (F.N. 16), Reticle (dia. ø19mm)		20X eyepiece C-W20X (F.N. 12.5), Reticle (dia. ø19mm), Magnification 1.3X		30X eyepiece C-W30X (F.N. 7), Reticle (dia. ø12mm), Magnification 1.4X	
			Total magnification	F.O.V. (ømm)	Total magnification	F.O.V. (ømm)	Total magnification	F.O.V. (ømm)	Total magnification	F.O.V. (ømm)
P-Achro 0.5X	0.045	189	4–40X	55.0–5.5	6–60X	40.0–4.0	8–80X	31.3–3.1	12–120X	17.5–1.8
P-Plan 1X	0.09	78	8–80X	27.5–2.8	12–120X	20.0–2.0	16–160X	15.6–1.6	24–240X	8.8–0.9
P-ERG Plan 1X ERGO	0.09	50	8–80X	27.5–2.8	12–120X	20.0–2.0	16–160X	15.6–1.6	24–240X	8.8–0.9
P-Plan Apo 0.5X	0.05	123	4–40X	55.0–5.5	6–60X	40.0–4.0	8–80X	31.3–3.1	12–120X	17.5–1.8
P-Plan Apo 1X	0.1	70	8–80X	27.5–2.8	12–120X	20.0–2.0	16–160X	15.6–1.6	24–240X	8.8–0.9
P-ED Plan 1.5X	0.15	45	12–120X	18.3–1.8	18–180X	13.3–1.3	24–240X	10.4–1.0	36–360X	5.8–0.6
P-ED Plan 2X	0.2	33	16–160X	13.8–1.4	24–240X	10.0–1.0	32–320X	7.8–0.8	48–480X	4.4–0.4

Magnification, Actual Field of View, Working Distance—SMZ800

Objectives	N.A.	Working distance (mm)	Eyepieces							
			10X eyepiece C-W10X (F.N. 22), Reticle (dia. ø25mm)		15X eyepiece C-W15X (F.N. 16), Reticle (dia. ø19mm)		20X eyepiece C-W20X (F.N. 12.5), Reticle (dia. ø19mm), Magnification 1.3X		30X eyepiece C-W30X (F.N. 7), Reticle (dia. ø12mm), Magnification 1.4X	
			Total magnification	F.O.V. (ømm)	Total magnification	F.O.V. (ømm)	Total magnification	F.O.V. (ømm)	Total magnification	F.O.V. (ømm)
P-Achro 0.5X	0.045	189	5.0–31.5X	44.0–7.0	8–47.3X	32.0–5.1	10.0–63.0X	25.0–4.0	15.0–94.5X	14.0–2.2
P-Plan 1X	0.09	78	10.0–63.0X	22.0–3.5	15–94.5X	16.0–2.5	20.0–126.0X	12.5–2.0	30.0–189X	7.0–1.1
P-ERG Plan 1X ERGO	0.09	50	10.0–63.0X	22.0–3.5	15–94.5X	16.0–2.5	20.0–126.0X	12.5–2.0	30.0–189X	7.0–1.1
P-Plan Apo 0.5X	0.05	123	5.0–31.5X	44.0–7.0	8–47.3X	32.0–5.1	10.0–63.0X	25.0–4.0	15.0–94.5X	14.0–2.2
P-Plan Apo 1X	0.1	70	10.0–63.0X	22.0–3.5	15–94.5X	16.0–2.5	20.0–126.0X	12.5–2.0	30.0–189X	7.0–1.1
P-ED Plan 1.5X	0.15	45	15.0–94.5X	14.7–2.3	22.5–141.8X	10.7–1.7	30.0–189.0X	8.3–1.3	45.0–283.5X	4.7–0.7
P-ED Plan 2X	0.2	33	20.0–126.0X	11.0–1.7	30–189X	8.0–1.3	40.0–252.0X	6.3–1.0	60.0–378X	3.5–0.6

Specifications

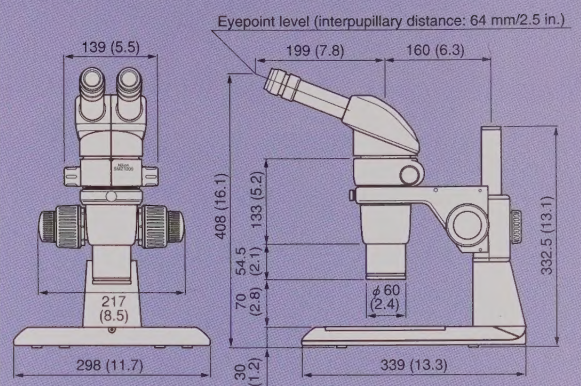
	SMZ1000	SMZ800
Optical system	Parallel-optics zoom system	
Total magnification Varies depending on eyepiece and objective used.	4X–480X	5X–378X
When coaxial episcopic illuminator is attached.	6X–540X	7.5X–525X
Eyepiece tubes	P-BT Standard Binocular, P-BTL Low Eye-level Binocular, P-BERG Tilting Binocular	
Eyepiece inclination	20° (Standard Binocular and Low Eye-level Binocular), 0°–30° (Tilting Binocular)	
Interpupillary distance adjustment	48–75mm (1.9–3.0 in.)	
Eyepieces (with diopter adjustment)	C-W10X (F.N. 22), C-W15X (F.N. 16), C-W20X (F.N. 12.5), C-W30X (F.N. 7)	
Zoom range	0.8X–8.0X	1X–6.3X
Zoom ratio	10 : 1	6.3 : 1
Objectives	P-Plan Apo 0.5X, 1X; P-ED Plan 1.5X, 2X; P-Plan 1X*; P-Achro 0.5X; P-ERG Plan 1X ERGO* *Usable at zoom magnifications larger than 1X when mounted on SMZ1000.	
Working distance	Please refer to the table on the previous page	
Illumination systems	P-ICI2 Coaxial Episcopic Illuminator (12V-100W halogen) (Intermediate magnification is 1.5X.)	
	G-LS 6V-10W Illuminator	
	G-LS 6V-10W Illuminator (with Articulated Arm or G-EIA Articulated Supporting Arm)	
	C-DSLS 6V-20W Illuminator (with Articulated Arm)	
	C-FPS Fluorescent Ring Illuminator	
	C-FIR Plastic Fiber-optic Ring Illuminator (12V-100W halogen)	
	C-FID Plastic Fiber-optic Bifurcated Illuminator (12V-100W halogen)	
Stands	C-PS Plain Focusing Stand	
	C-PSC Compact Plain Focusing Stand	
	C-DS Diascopic Stand S	
	C-PS160 Plain Stand	
	C-DSS Diascopic Stand	
	C-DSD Diascopic Stand	
	C-BD Diascopic Bright/Darkfield Stand	
	P-THS Teaching Head Stand	
	Large Stage Stand	
Focusing mount	C-FMC Focusing Mount C	
	C-FMA Focusing Mount A	
	C-FMB Focusing Mount B	
Photomicrographic/ CCTV system	Nikon Photomicrographic System FX-III Series or CCTV camera can be attached through Beam Splitter and Adapter. Photo-tube beam-split ratio: please refer to the table on page 9.	
Power consumption	Diascopic stands: 80W	
	C-FPS115 Fluorescent Ring Illuminator: 24W	
	C-FPS230 Fluorescent Ring Illuminator: 16W	
	Fiber Transformer: 135W	

Note: For possible combinations of accessories, please refer to the system diagram on page 10.

Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. April 2000.

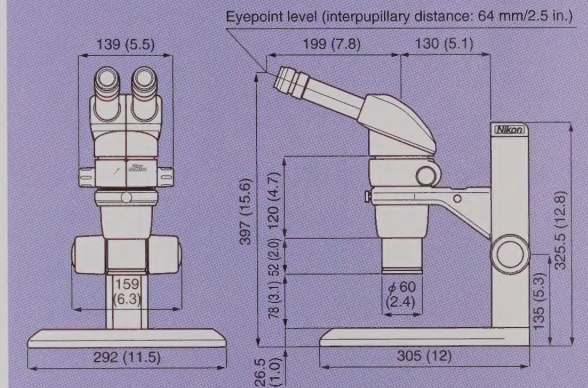
Dimensions

SMZ1000



Unit: mm (in)

SMZ800



Unit: mm (in)

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WARNING TO ENSURE CORRECT USAGE, READ THE CORRESPONDING MANUALS CAREFULLY BEFORE USE.

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